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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/007,570	12/10/2001	Wen-Chiang Huang		3474

7590 02/09/2004

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EXAMINER

EDWARDS, LAURA ESTELLE

ART UNIT	PAPER NUMBER
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1734

DATE MAILED: 02/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/007,570

Applicant(s)

HUANG, WEN-CHIANG

Examiner

Laura E. Edwards

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 9-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 121001.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-8, drawn to a method, classified in class 264, subclass 401.
- II. Claims 9-16, drawn to an apparatus, classified in class 425, subclass 174.4.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another material different process such as forming a two dimensional pattern on a microelectronic device.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Wen Huang on 1/16/04 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-8. Affirmation of this election must be made by applicant in replying to this Office action. Claims 9-16 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (US 5,900,637) in view of Hagenau (US 6,051,179).

Smith teaches a maskless lithography method for forming a two dimensional object comprising exposing a substrate coated with a curable composition to a micro-focused energy beam generated by Fresnel zone plates, the Fresnel zone plates focusing parallel beamlets of energy beam from a radiation source (i.e., UV, x-ray, etc.) so that the beamlets converge to an array of focal points at predetermined positions of the lamina or coated substrate in accordance with the control of a computer (see col. 2, lines 55-65). Even though Smith recognizes that an image and/or pattern can be sequentially formed on the substrate (see claims 29 /30) and the sizes of such pattern can be much larger than described (see col. 7, lines 56-62), Smith is silent

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concerning building up of the object via further respective coating steps and energy beam exposing steps to form a three dimensional object. However, it was known in the maskless lithography art, at the time the invention was made, to form a three dimensional object via repetitive coating and exposing steps to radiation energy as evidenced by Hagenau (see abstract). It would have been obvious to one of ordinary skill in the art, to utilize the Smith lithography method to form a three dimensional object via further respective coating and exposing steps, as taught by Hagenau, in instances where an increase in size of the pattern and therefore the dimensions of the object is desired.

With respect to claims 2 and 3, col. 2, lines 60-65 evidence modulating of individual ones of the array of focal points via shutter means.

With respect to claim 4, even though Smith is silent concerning coating the substrate with photo-curable resin to form the object, it is conventional in the maskless lithography art to form a three dimensional object on a substrate using a photo-curable resin as evidenced by Hagenau (see col. 3, lines 10-18). It would have been obvious to one of ordinary skill in the art to use a photo-curable resin as taught by Hagenau in the Smith lithography method in order to facilitate formation and shaping of the desired image and/or pattern on the substrate.

With respect to claims 5-7, see the response to claim 4. In addition, Hagenau recognizes the use of additives with the photo-curable resin including ceramic particulate to improve the quality of the three dimensional object as evidenced by col. 13, lines 7-10 and col. 13, lines 37-43. It would have been obvious to one of ordinary skill in the art to use a photo-curable resin including an appropriate amount of additives including ceramic particles, as taught by Hagenau,

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in the Smith lithography method in order to improve the quality of the three dimensional object formed.

With respect to claim 8, Smith recognizes the use of a beam or radiation source including electron beam, x-ray, and UV(see col. 1, lines 29-37 and col. 3, lines 66+ to col. 4, lines 1-3). Even though Smith is silent concerning the variety of radiation sources that can be used with the maskless lithography method, Hagenau recognizes additional radiation sources including laser (see col. 2, line 9) and that any appropriate radiation source may be used (see col. 7, lines 28-34). Therefore, Applicant's use of known radiation sources is within the level of ordinary skill in the art.

Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (US 5,900,637) and Hagenau (US 6,051,179) as applied above and further in view of Batchelder et al (US 5,303,141).

The teachings of Smith and Hagenau have been mentioned above. While the combined teachings suggest using a photo-curable resin including an additive to improve the quality of the object produced, neither Smith nor Hagenau teach the resin including a metallic additive. However, it was known in the lithography art, at the time the invention was made, to use a photo-curable resin including a metallic additive as well as other additives and combinations thereof to impart a desired electrical or structural characteristic to the 3-D object formed as evidenced by Batchelder et al (see col. 3, lines 15-22). It would have been obvious to one of ordinary skill in the art to use a photo-curable resin including an appropriate amount of additives including metallic particles, as taught by Batchelder et al, in the lithography method

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described by the combination above in order to impart a desired electrical or structural characteristic to the three dimensional object formed.


Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following publication and patents disclose the state of the art with respect to lithography methods for forming 3-D objects: Ueno (US 2001/0048184A1), Gillette (US 5,573,721), Johnson (US 6,498,685), Fries (US 6,544,698), and Serbin et al (US 5,904,889).

The following technical reference discloses a chart on known radiation sources including UV, X-ray, gamma-ray, atomic particle beam, etc.: Kirk-Othmer-Encyclopedia of Chemical Technology -4th edition, Vol. 20, "Radiation Curing", pages 832-834 (1996).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura E. Edwards whose telephone number is (571) 272-1227. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (703) 308-3853. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.


Laura E. Edwards
Primary Examiner
Art Unit 1734

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January 30, 2004